

To the study of Australian Tersilochinae (Hymenoptera: Ichneumonidae)

К изучению австралийских терзилохин (Hymenoptera: Ichneumonidae: Tersilochinae)

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КЛЮЧЕВЫЕ СЛОВА: Австралия, *Australochus*, *Barycnemis*, *Diaparsis*, новый вид, систематика.

ABSTRACT. Holarctic genus *Barycnemis* with a new species *B. australica* sp.n. is recorded from Australia and Southern Hemisphere for the first time. New material on two species, *Australochus clypeator* and *Diaparsis proterva*, is provided, and colour photographs of these species are given for the first time. Taxonomic status of the genus *Australochus* is discussed.

РЕЗЮМЕ. Впервые отмечен из Австралии и южного полушария голарктический род *Barycnemis* с новым видом *B. australica* sp.n. Представлен новый материал по австралийским видам *Australochus clypeator* и *Diaparsis proterva*, а также впервые даны цветные иллюстрации этих двух видов. Обсуждается таксономический статус рода *Australochus*.

Introduction

Fauna of Tersilochinae of Australia was preliminarily studied by Gauld [1984]. He provided an identification key to nine genera occurring in Australia: *Allophrys* Förster, 1869, *Diaparsis* Förster, 1869, *Phradis* Förster, 1869, *Probles* Förster, 1869 (with two, nine, five and three undescribed species in Australia respectively), as well as *Sathropterus* Förster, 1869 (one species), *Stethantyx* Townes, 1971 (three introduced species), and three endemic Australian genera, *Areyonga* Gauld, 1984, *Horstmannochus* Gauld, 1984 and *Petilochus* Gauld, 1984, each containing a single species. Later, one more genus, *Australochus* Khalaim, 2004 with the only species *A. clypeator* Khalaim, 2004, and abundant Australian species *Diaparsis proterva* Khalaim, 2008 were described from this country from the collection of the Zoological Institute RAS, St. Petersburg, Russia [Khalaim, 2004, 2008].

In this paper, a Holarctic genus *Barycnemis* Förster, 1869 is recorded from Australia and Southern Hemisphere for the first time, and new material on two

Australian species described by Khalaim, *Australochus clypeator* and *Diaparsis proterva*, is provided.

Material and Methods

Material for this study was obtained from the following institutions: American Entomological Institute, Gainesville, Florida, U.S.A. (AEIC); Zoological Institute RAS, St. Petersburg, Russia (ZISP); and New Zealand Arthropod Collection, Auckland, New Zealand (NZAC). I am thankful to curators of these collections, David Wahl in AEIC and Darren Ward in NZAC, for loan of valuable tersilochine material.

The morphological terminology is mostly that of Khalaim [2011]. Photographs were taken at ZISP with a DFC 290 digital camera attached to a Leica MZ16 stereomicroscope; images were combined using Helicon Focus software. All photographs were taken from holotypes.

Results

Subfamily Tersilochinae

Genus *Australochus* Khalaim, 2004

Type species: *Australochus clypeator* Khalaim, 2004.

The genus comprises one species, *A. clypeator*, known only from the holotype female from Australia.

Australochus belongs to the *Stethantyx* genus-group, assigned by Khalaim & Broad [2013] for two Neotropical genera, *Stethantyx* Townes, 1971 and *Megalochus* Khalaim et Broad, 2013, as it has fore wing with an obtuse-angled radial cell and long and slender intercubitus and abscissa of cubitus between intercubitus and second recurrent vein (Fig. 10). In this genus-group, *Australochus* is apparently related to the genus *Stethantyx* as both have first metasomal tergite with distinct glymma joining by furrow to the ventral part of postpetiole and possess unspecialized antennae, but *Australochus* differs from this genus by its prepectal carina with

upper end strongly curved and reaching anterior margin of mesopleuron near the level of centre of pronotum (in *Stethantyx* this carina not joining anterior margin of mesopleuron, usually continuing above and backwards to the subtegular ridge), propodeum deeply impressed along midline (Figs 11, 14), strongly transverse second metasomal tergite (Fig. 15) (in *Stethantyx* this tergite is subsquare to very long), and ovipositor apically with a weak nodus and fine teeth ventrally (Fig. 16).

Stethantyx is a large Neotropical genus with 43 described [Khalaim, Broad, 2013; Khalaim, Ruiz-Cancino, 2013; Khalaim et al., 2013] and many undescribed species. Three species of *Stethantyx*, *S. argentiensis* (Blanchard, 1945), *S. parkeri* (Blanchard, 1945) and one unidentified species, occur in Australia, all were introduced from South America to control *Listroderes obliquus* Klug, 1829 (Coleoptera: Curculionidae), a pest of many cultivated vegetables [Kerich, 1961; Wilson, Wearne, 1962; Gauld, 1984]. *Australochus clypeator* strongly differs from the three introduced species of *Stethantyx*, and also does not correspond to any Neotropical

species of this genus from a large material I was able to examine from Costa Rica, Ecuador, Peru, French Guiana, Venezuela, Brazil and Argentina.

Therefore, *A. clypeator* is unlikely to have a Neotropical origin, and I believe that *Australochus* is a native Australian genus, but its taxonomic status and relationship with *Stethantyx* require further investigation.

Australochus clypeator Khalaim, 2004
Figs 1–16.

MATERIAL EXAMINED. Australia: "Port Arthur Tasmania II.7–III.1", 1 female (AEIC).

REMARKS. Here I provide additional characters which were not mentioned in the original description. Mandibles rather short, with apices slightly overlapping (Fig. 3). Flagellomeres 4–6 bearing conspicuous finger-shaped subapical structures on outer side (Fig. 2, arrows). Scutellum with lateral longitudinal carinae short, developed only at extreme base of scutellum. Prepectal carina distinct, its upper end strongly curved and reaching anterior margin of mesopleuron



Figs 1–6. *Australochus clypeator*, female (holotype): 1 — antenna, lateral view; 2 — base of antenna, lateral view; 3 — head, frontal view; 4 — head and mesoscutum, dorsolateral view; 5 — head and anterior part of mesosoma, dorsal view; 6 — hind leg, lateral view.

Рис. 1–6. *Australochus clypeator*, самка (голотип): 1 — антenna, сбоку; 2 — основание антennы, сбоку; 3 — голова, спереди; 4 — голова и мезоскутум, сверху-сбоку; 5 — голова и передняя часть мезосомы, сверху; 6 — задняя нога, сбоку.

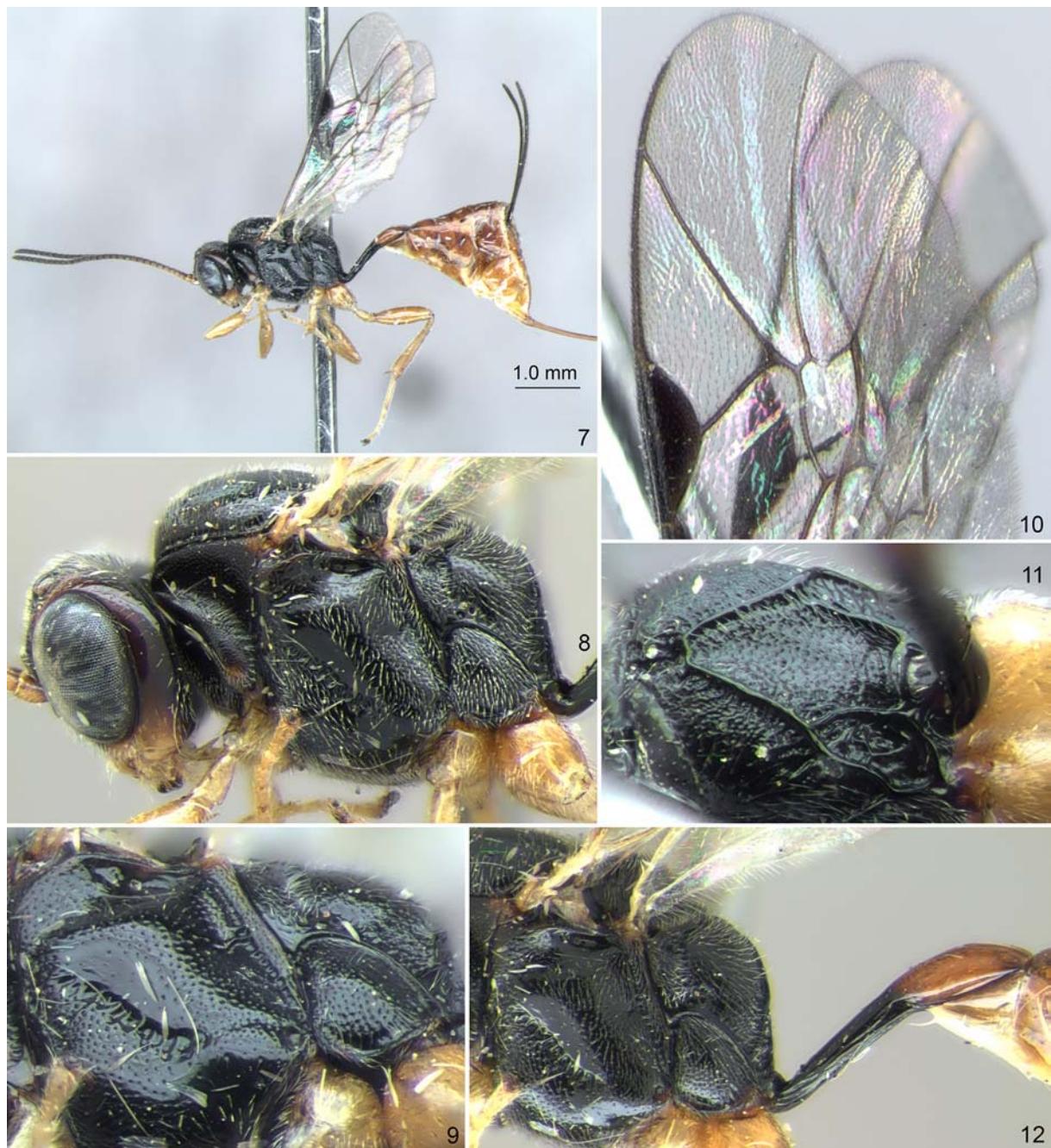
somewhat above the level of centre of pronotum, not extending upwards to subtegular ridge. Apical area of propodeum strongly impressed along midline, especially anteriorly (Figs 11, 14). Fore wing with first and second abscissae of radius meeting at obtuse angle (Fig. 10); intercubitus and abscissa of cubitus between intercubitus and second recurrent vein long and slender. Tergite 2 of metasoma very short, strongly transverse (Fig. 15).

The female from Tasmania exactly corresponds with the holotype in structure and coloration but is conspicuously smaller.

Genus *Barycnemis* Förster, 1869

Type species: *Porizon claviventris* Gravenhorst, 1829.

Moderately large predominantly Holarctic genus with 35 species, including one species in India [Khalaïm, 2011]



Figs 7–12. *Australochus clypeator*, female (holotype): 7 — habitus (without ovipositor), lateral view; 8 — head and mesosoma, lateral view; 9 — mesosoma, ventrolateral view; 10 — apex of fore wing; 11 — propodeum, postero-dorso-lateral view; 12 — posterior part of mesosoma and first tergite, lateral view.

Рис. 7–12. *Australochus clypeator*, самка (голотип): 7 — общий вид, сбоку (без яйцеклада); 8 — голова и мезосома, сбоку; 9 — мезосома, снизу-сбоку; 10 — вершина переднего крыла; 11 — проподеум, сзади-сверху-сбоку; 12 — задняя часть мезосомы и первый тергит, сбоку.

and one species in Central America [Khalaim, Broad, 2012]. This is the first record of *Barycnemis* from Australia and Southern Hemisphere.

Barycnemis australica Khalaim, sp.n.
Figs 17–23.

MATERIAL EXAMINED. Holotype: female, Australia, New South Wales, Monga State Forest, 35°25' S, 149 55' E, 26.XI.1979, coll. V.F. Zaitsev (ZISP).

Paratype. Australia: New South Wales: "Dead Horse Gap 1650 m. Snowy Mts. NSW Australia February 2", 1 male (AEIC).

COMPARISON. The new species is a distinct member of *Barycnemis* as it has a long and somewhat compressed laterally mesosoma; long, slightly upcurved anteriorly foveate groove of mesopleuron (Fig. 20); long basal part of propodeum (Fig. 21); thickened femora and tibiae (Fig. 22); rather strongly curved hind tibial spurs (Fig. 22); and short and robust ovipositor (Fig. 23). *Barycnemis australica* sp.n. is



Figs 13–19. *Australochus clypeator*, female (holotype): 13 — metasoma, lateral view; 14 — posterior part of mesosoma, posterolateral view; 15 — postpetiole and tergites 2 and 3, dorsolateral view; 16 — apex of ovipositor, lateral view. *Barycnemis australica* sp.n., female (holotype): 17 — head with antennae, lateral view; 18 — head, frontal view; 19 — head and mesoscutum, dorsal view.

Рис. 13–19. *Australochus clypeator*, самка (голотип): 13 — метасома, сбоку; 14 — задняя часть мезосомы, сзади-сбоку; 15 — расплющ первое тергита и тергиты 2 и 3, сверху-сбоку; 16 — вершина яйцеклада, сбоку. *Barycnemis australica* sp.n., самка (голотип): 17 — голова с антеннами, сбоку; 18 — голова, спереди; 19 — голова и мезоскутум, сверху.

readily distinguished from all known Northern Hemispheric species in this genus by its very slender base of flagellum (Fig. 17), propodeum with distinct basal keel (Fig. 21), long distance between the propodeal spiracle and pleural carina (Fig. 20), and first metasomal tergite with isolated vestigial glymma (Fig. 20).

DESCRIPTION. Female. Body length 5.5 mm. Fore wing length 4.0 mm.

Head rounded behind eyes in dorsal view (Fig. 19); temple 0.65 times as long as eye width. Eyes bearing short sparse hairs. Clypeus lenticular, 3.4 times as broad as long (Fig. 18);

in lateral view, weakly convex in upper part and flat in lower part; smooth and shining in lower half, dull and finely punctate on very finely granulate background in upper half. Mandible with upper tooth much longer than lower tooth. Malar space 0.65 times as long as basal width of mandible. Antennal flagellum (Fig. 17) basally very slender, with 21 flagellomeres; second flagellomere almost 3.5 times, and subapical flagellomeres 1.3–1.4 times as long as broad. Face with small but high and sharp median tubercle in upper part (somewhat below the level of lower margin of antennal sockets). Face, frons and vertex with very fine (mostly indistinct) punctures on strongly



Figs 20–25. *Barycnemis australica* sp.n., female (holotype): 20 — posterior part of mesosoma and first tergite, lateral view; 21 — propodeum, dorsolateral view; 22 — hind leg, lateral view; 23 — metasoma with ovipositor, lateral view. *Diaparsis proterva*, female (holotype): 24 — head and anterior part of mesosoma, lateral view; 25 — lower part of mesosoma and hind leg, lateral view.

Рис. 20–25. *Barycnemis australica* sp.n., самка (голотип): 20 — задняя часть мезосомы и первый тергит, вид сбоку; 21 — проподеум, сверху-сбоку; 22 — задняя нога, сбоку; 23 — метасома с яйцекладом, сбоку; *Diaparsis proterva*, самка (голотип): 24 — голова и передняя часть мезосомы, сбоку; 25 — нижняя часть мезосомы и задняя нога, сбоку.

granulate background, dull. Temple finely granulate with fine sparse punctures, dull. Occipital carina complete.

Mesoscutum distinctly granulate, dull, with moderately dense punctures. Scutellum with lateral longitudinal carinae developed only in its anterior 0.3. Notaulus with longitudinal wrinkle anterolaterally and long longitudinal impression behind this wrinkle (Figs 17, 19). Mesopleuron densely punctate, finely granulate, centrally almost smooth and weakly shining, peripherally dull. Foveate groove extending in anterior 0.7 of mesopleuron, reaching upper end of prepectal carina anteriorly, moderately broad, with transverse wrinkles, upcurved anteriorly (Fig. 20). Dorsolateral area of propodeum almost smooth and weakly shining anteriorly to finely granulate and dull posteriorly, with fine but sharp

punctures. Propodeum with distinct basal keel which is about as long as apical area (Fig. 21). Propodeal spiracle separated from pleural carina by 2.5–3.0 times diameter of spiracle (Fig. 20). Transverse carina of propodeum with short adjacent wrinkles. Apical area flat, widely rounded anteriorly; apical longitudinal carinae strong, reaching transverse carina anteriorly.

Fore wing with second recurrent vein postfurcal (Fig. 23). Intercubitus short and thick, distinctly shorter than abscissa of cubitus between intercubitus and second recurrent vein. First abscissa of radius distinctly longer than width of pterostigma. First and second abscissae of radius meeting at right angle. Metacarpus almost reaching apex of fore wing.



Figs 26–30. *Diaparsis proterva*, female (holotype): 26 — head with antennae, frontal view; 27 — propodeum, dorsal view; 28 — posterior part of mesosoma and first tergite, lateral view; 29 — tergites 1 and 2, dorsal view; 30 — metasoma with ovipositor, lateral view.

Рис. 26–30. *Diaparsis proterva*, самка (голотип): 26 — голова с антеннами, спереди; 27 — проподеум, сверху; 28 — задняя часть мезосомы и первый тергит, сбоку; 29 — тергиты 1 и 2, сверху; 30 — метасома с яйцекладом, сбоку.

Postnervulus intercepted distinctly below its middle. Hind wing with nervellus somewhat reclivous.

Legs robust, femora and tibiae conspicuously thickened (Fig. 22). Hind femur short and thick, 3.0 times as long as broad and 1.05 times as long as tibia. Hind basitarsus 0.6 times as long as hind tibia. Spurs of hind tibia strongly curved apically. Tarsal claws rather large, not pectinate.

First metasomal tergite slender, 4.0 times as long as posteriorly broad, entirely smooth, its dorsal margin strongly and evenly rounded in lateral view (Fig. 20). Glymma isolated (furrow between glymma and ventral part of postpetiole absent), vestigial, situated on ventrolateral side of the tergite near its midlength (Fig. 20). Second tergite 2.35 times as long as anteriorly broad. Thyridial depression about twice as long as broad. Ovipositor robust, weakly and evenly upcurved, with weak dorsal subapical depression (Fig. 23); sheath about 1.4 times as long as first tergite and 1.7 times as long as hind tibia.

Head and mesosoma black (lower corner of pronotum and upper anterior corner of mesopleuron reddish brown). Palpi, mandible (teeth reddish) and tegula brownish yellow; clypeus reddish brown in upper half and yellow in lower half. Antenna with scape and pedicel brown, flagellum black. Wings slightly infumate with brown, pterostigma dark brown. Legs entirely yellowish brown. First metasomal segment dark brown. Metasoma behind first tergite yellow ventrally and predominantly brown laterally and dorsally.

Male. Flagellum with 24 flagellomeres, slender, strongly tapered towards apex. Malar space shorter, almost half as long as basal mandibular width. Propodeum with basal keel about 1.7 times as long as apical area. Legs less robust than in female; hind femur slightly thickened; hind tibia about as long as femur. Spurs of hind tibia strongly curved apically. Metasoma compressed laterally; second tergite longer than in female. Wings slightly infumate with brown.

ETYMOLOGY. From the type locality, Australia.

DISTRIBUTION. Australia.

Genus *Diaparsis* Förster, 1869

Type species: *Ophion nutritor* Fabricius, 1804.

Large almost worldwide genus with about 80 described species. The genus is species rich in Holarctic, Afrotropical and Oriental regions, but rare or entirely absent in the Neotropical region. Gauld [1984] reported about nine species in Australia, but only one, *D. proterva* Khalaim, is described.

Diaparsis proterva Khalaim, 2008

Figs 24–30.

MATERIAL EXAMINED. Australia: Australian Capital Territory, Canberra, CSIRO, grass/clover, 15 October 1988, coll. R. Macfarlane, 1 female (NZAC). Northern Territory, Mt. Sander, 1300 m, 21 September, 1 female (AEIC). Tasmania, Strahan, March 14–26, 2 females (AEIC).

REMARKS. Most abundant Australian species of *Diaparsis*. All examined specimens are rather uniform, with minor variation in structure and coloration.

References

Gauld I.D. 1984. Subfamily Tersilochinae. In: An Introduction to the Ichneumonidae of Australia // Bulletin of the British Museum (Natural History) (Entomology). Vol.895. P.304–316.

Kerrick G.J. 1961. A study of the Tersilochine parasites of vegetable weevils of the genus *Listeroderes* (Hym., Ichneumonidae) // Eos. Vol.37. No.2. P.497–503.

Khalaim A.I. 2004. New tersilochines from Australia and New Zealand (Hymenoptera: Ichneumonidae, Tersilochinae) // Zootaxa. Vol.13. No.1. P.43–45.

Khalaim A.I. 2008. A new species of the genus *Diaparsis* Förster from Australia (Hymenoptera: Ichneumonidae: Tersilochinae) // Zootaxa. Vol.17. No.1. P.83–84.

Khalaim A.I. 2011. Tersilochinae of South, Southeast and East Asia, excluding Mongolia and Japan (Hymenoptera: Ichneumonidae) // Zootaxa. Vol.20. No.1. P.96–148.

Khalaim A.I., Broad G.R. 2012. Tersilochinae (Hymenoptera: Ichneumonidae) of Costa Rica, part 1. Genera *Allophrys* Förster, *Barycnemis* Förster and *Meggoleus* Townes // Zootaxa. Vol.3185. P.36–52.

Khalaim A.I., Broad G.R. 2013. Tersilochinae (Hymenoptera: Ichneumonidae) of Costa Rica, part 2. Genera *Megalochus* gen. nov. and *Stethantyx* Townes // Zootaxa. Vol.3693. No.2. P.221–266. doi: 10.11646/zootaxa.3693.2.8

Khalaim A.I. & Ruiz-Cancino E. 2013. Mexican species of the genus *Stethantyx* Townes (Hymenoptera, Ichneumonidae, Tersilochinae) // Zookeys. Vol.360. P.83–94. doi: 10.3897/zookeys.360.6362

Khalaim A.I., Sääksjärvi I.E., Bordera S. 2013. Tersilochinae of Western Amazonia (Hymenoptera: Ichneumonidae). Genus *Stethantyx* Townes, part 1 // Zootaxa. Vol.3741. No.3. P.301–326. doi: 10.11646/zootaxa.3741.3.1

Wilson F., Wearne G.R. 1962. The introduction into Australia of parasites of *Listroderes obliquus* Klug. // Australian Journal of Agricultural Research. Vol.13. P.249–257. doi: 10.1071/AR9620249